Serial No. 09/902,859
Art Unit No. 2133

REMARKS

Claims 1-14 are currently pending in the patent application. The Examiner has requested copies of each reference cited in the specification. Since the application is based on a priority filing, copies are not in the file of the undersigned attorney. Copies have been requested from foreign counsel and will be provided by Applicants as soon as possible. The Examiner has rejected Claims 1-14 under 35 USC 103 as being unpatentable over Bond in view of Richardson. For the reasons set forth below, Applicants believe that the claims are patentable over the cited art.

The present invention is directed to a system and method for low-density parity-check (LDPC) encoding of data, the method comprising the steps of defining a first MxN parity check matrix; generating, based on the first parity check matrix, a second parity check matrix having an MxM triangular sub-matrix; and, mapping the data into an LDPC code word based on the second parity check matrix (see: independent Claims 1, 9, 13 and 14). Applicants have amended the language of some of the dependent claims to address typographical and grammatical errors found therein.

The Bond reference is directed to a method for constructing low density parity check codes to improve performance in the use thereof. The Examiner has stated that Bond teaches constructing low density parity check codes by first identifying the matrix [R:C]. In the relevant teachings found on page 260 in section II, Bond discusses binary matrices R:C. Bond does not, however, define a first MxN (or, in Bond's terms, a first RxC) parity check matrix. In fact, Bond states that "[w]e have found that the best codes for our application are regular codes that could be constructed by taking [R:C] with three ones in each column and a constant number of ones in each *row of R and C (emphasis added)*." The above teachings seem to indicate that both R and C represent rows. Clearly, therefore, [R:C] is not the same as nor is it suggestive of a first MxN parity check matrix.

The Examiner next cites the section III teachings of Bond against the claim language of "generating, based on the first parity check matrix, a second parity check matrix having an MxM triangular sub-matrix." Applicants have reviewed the cited section and fail to see any teaching or suggestion of an MxM triangular sub-matrix. What Bond

teaches in section III is code construction to provide a matrix C wherein the graph would not have any four cycles and wherein C^{-1} would have equal numbers of 1s and 0s. As such, Bond teaches that C be constructed as a circulant matrix but that R be constructed differently. As shown in Figs. 1 and 2 of the Bond paper, different parity check matrices were generated for R for rate 1/2 codes and for rate 4/7 codes. Neither provides a second parity check matrix having an MxM sub-matrix. In fact, Bond expressly teaches that for the rate 4/7 embodiment, where *n* was divisible by 3, R was constructed from an *n x n* submatrix that was the sum of three permutation matrices (for which no description is provided) and three *n/3 x n/3* permutation submatrices. Applicants respectfully assert that the Bond passages do not teach or suggest the invention as claimed. What is claimed is "generating, based on the first parity check matrix [MxN], a second parity check matrix having an MxM triangular sub-matrix." Applicants are not claiming a step of constructing any submatrix from a matrix. Rather, Applicants are claiming a very specific embodiment which is neither taught nor suggested by Bond.

The Examiner has acknowledged that Bond does not teach or suggest mapping the data into a LDPC code word based on the second parity check matrix and has cited the Richardson reference. Applicants first note that Richardson does not provide the teachings which are missing from the Bond paper regarding the generating of a second parity check matrix having an MxM triangular sub-matrix. Further, Applicants respectfully contend that the cited Richardson teachings, regarding encoding matrices, do not render obvious the third claim feature. Richardson does not teach or suggest generating a second parity check matrix and does not teach or suggest mapping data into an LDPC code word based on a second parity check matrix.

Applicants respectfully remind the Examiner that, for references to render claim language obvious under 35 USC 103, the references must include some teaching or suggestion of the claim features. Applicants believe that neither the Bond nor the Richardson reference teaches or suggests the claim features of generating a second parity check matrix as claimed or of mapping the data into an LDPC code word as claimed. Absent some teaching or suggestion, an obviousness

rejection of the independent claims (Claims 1, 9, 13 and 14) simply cannot be sustained.

With regard to Claims 2, 6, and 10, which recite further comprising eliminating 4-cycles from the second matrix, Applicants note that the claim requires first that the second matrix be generated and then that 4-cycles be eliminated from the second matrix, which second matrix comprises an MxM triangular sub-matrix and has been generated based on the first parity check matrix. Bond describes constructing C as a circulant matrix so that the graph of C would not have four cycles. Clearly the Bond teachings are not the same as or suggestive of the invention as claimed.

With regard to Claims 3, 7 and 11, Applicants point out that the claims recited "cyclically shifting" rows. However, what the Examiner cites is the Bond teaching that C should be a circulant matrix. Applicants respectfully assert that a circulant matrix does not anticipate or obviate a step of cyclic shifting of matrix rows.

Finally, with regard to Claims 4, 8, and 12, the Examiner cites section III at page 260 as teaching "setting vertices of each bit in the bipartite graph to a parity

equation vertex." Applicants have reviewed the part of section III found on page 260 and find no such statement. Moreover, even if Bond did teach setting the vertices to parity, such is not what is claimed. The claims recite setting entries along the main diagonal of the MxM triangular sub-matrix of the second parity check matrix to the same value. Since Bond does not teach a second parity check matrix, does not teach a triangular sub-matrix of a second parity check matrix, and does not teach setting entries along the main diagonal of a triangular sub-matrix of a second parity check matrix, it cannot be concluded that Bond obviates the claim language.

Based on the foregoing amendments and remarks, Applicants respectfully request entry of the amendments, reconsideration of the amended claim language in light of the remarks, withdrawal of the rejections, and allowance of the claims.

Respectfully submitted,
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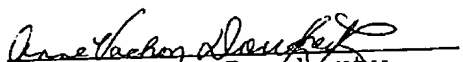
By: 
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